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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/807,682	04/16/2001	John Malcolm Gascoyne	JMYT-235US	2328

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EXAMINER

RUTHKOSKY, MARK

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 02/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/807,682

Applicant(s)

GASCOYNE ET AL.

Examiner

Mark Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-5, 13 and 16-23 stand rejected under 35 U.S.C. 102(b) as being anticipated by EP 791,974.

The instant claims are to a process for preparing a solid polymer electrolyte membrane comprising an ion-conducting polymer, a catalyst, and a high-surface area supported material. The process includes associating the catalyst with a solution of the ion-conducting polymer to produce a membrane such that the catalyzed support is incorporated into the solid polymer electrolyte membrane, wherein the ion-conducting polymer is in a liquid medium that is aqueous-based and is essentially free from organic solvents.

EP 791,974 teaches a to a process for preparing a solid polymer electrolyte membrane comprising an ion-conducting polymer, Nafion, a catalyst, Pt, and a high-surface area supported material, carbon black fiber (see for example col. 9, l. 15-35.) The process includes associating a 40% platinum catalyst with the support material and combining the catalyzed support with a

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solution of the ion-conducting polymer such that the catalyzed support is incorporated into a solid polymer electrolyte membrane. The ion-conducting polymer is in a liquid medium that is aqueous-based (Nafion in water) and is essentially free from organic solvents. Thus, the claims are anticipated.

The rejection of claims 1-4, 11-12, 16 and 20-23 under 35 U.S.C. 102(b) as being anticipated by Cisar et al. (US 5,635,039) has been overcome by the applicant's amendment.

Claims 1, 3-4, and 11-23 stand rejected under 35 U.S.C. 102(e) as being anticipated by Denton et al. (US 6,042,958.) Claim 24 is rejected under 35 U.S.C. 102(e) as being anticipated by Denton et al. (US 6,042,958.)

Denton et al. (US 6,042,958) teaches a process for preparing a solid polymer electrolyte membrane comprising an ion-conducting polymer, a catalyst, and a high-surface area supported material (see claims 1-28.) The membrane is a mixture of a porous substrate of fibers and at least one ion-conducting polymer. Glass, silica, ceramic, quartz and other materials are noted as the fibers. A catalyst, such as platinum, may be added to a support material oxide (see claim 12, example 1, and col. 5, l. 15-40) the fibers are combined with the ion-conducting polymer (Nafion) in an aqueous solution, (see the examples.) The fibers have a diameter of 0.1-50  $\mu\text{m}$ . A solution of perfluorsulfonic acid is added to the fibrous material (see the examples.) The membrane is cast onto a PFTE support by mixing the fibrous material with an aqueous solution of Nafion forming a composite membrane.

Thus, the claims are anticipated.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Denton et al. (US 6,042,958), as applied to claims 1, 3-4, and 11-22 in view of EP 875,524.

The teachings of Denton et al. (US 6,042,958) have been disclosed. With regard to claims 6-7, the reference does not teach an amount of catalyst to be deposited on the support to be from 1-25%. With regard to claims 8-10, the reference does not teach the amount of catalyst to be incorporated into the membrane to be lower than 0.1 mg/cm<sup>2</sup>. EP 875,524 teaches a carbon supported Pt catalyst with a loading of 0.25 mg/cm<sup>2</sup>, which will amount to less than 25% of the electrode weight. The amount of catalyst in the electrode will be directly proportionate to the amount of catalyst in the MEA. It would be obvious to one of ordinary skill in the art at the time the invention was made to alter the amount of catalyst on the support material in order to achieve optimal catalyzation of the fuel cell reactants. One of ordinary skill in the art would have an understanding of the amounts of catalyst necessary to react with the fuel and oxidant gasses based on the teachings of EP 875,524. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

***Response to Arguments***

Applicant's arguments filed 11/23/2003 have been fully considered but they are not persuasive.

With regard to the applicant's arguments that EP 791,974 does not disclose all of the features of the claimed invention, the examiner disagrees. The method of making the membrane is disclosed in col. 9, lines 15-25. In the preparation, a carbon supported platinum catalyst is added into a Nafion-water mixture. The solution is then added into a carbon fiber mat forming an ionically conductive electrode- membrane. While the layer is used as a cathode in the invention, the Nafion material inherently is an ion conducting polymer membrane as it transfers ions to and from the cathode material. The claims do not preclude a composite membrane as taught by the reference. With regard to the applicant's assertion that the preparation of the Nafion mixture is not a solution, it is clear from the methods described in EPA 731,520 (as noted in EP 791,974, lines 15-25) that the mixture is a solution of Nafion (for example, see '520 col. 11, lines 25-35.) Water is well described as a solvent for Nafion.

With regard to the applicant's arguments that Denton (US 6,042,958) does not disclose all of the features of the claimed invention, the examiner disagrees. The applicant states that, 'In particular, Denton does not disclose a process where a catalyst is associated with a support material which is incorporated into a membrane and the membrane is formed from an aqueous ion-conducting polymer solution. Further, the membrane of the present invention is formed in an aqueous ion-conducting polymer solution.' The Denton reference clearly teaches a catalyst which is supported by the individual fibers of the composite membrane in claims 1, 9 and 12. The fibers form a porous substrate that is embedded with Nafion by adding an aqueous solution

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of Nafion to the fibrous substrate. The composite membrane inherently has the fibers incorporated into the Nafion membrane. The reference teaches adding an aqueous solution of Nafion to the fibers and does not disclose the use of organic solvents in the solution. As the reference teaches all of the elements of the claimed invention, the claimed are anticipated.

As the discussion of the rejection under 35 U.S.C. focuses on the Denton reference, the previous comments provide the reasoning for maintaining the rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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***Examiner Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:00.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number is 703-872-9306.

Mark Ruthkosky

Primary Patent Examiner

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2/2/04